



Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 4492 (1968): Welded V-blocks (Diameter Range 300 to 2000 mm) [PGD 25: Engineering Metrology]

“ज्ञान से एक नये भारत का निर्माण”

Satyanaaranay Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartṛhari—Nītiśatakam

“Knowledge is such a treasure which cannot be stolen”



BLANK PAGE



PROTECTED BY COPYRIGHT

IS : 4492 - 1968
(Reaffirmed 1998)

Indian Standard
SPECIFICATION FOR
WELDED V-BLOCKS
(DIAMETER RANGE 300 TO 2000 mm)

(Third Reprint MAY 2002)

UDC 621.229.5

© Copyright 1968

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR WELDED V-BLOCKS

(DIAMETER RANGE 300 TO 2000 mm)

Engineering Metrology Sectional Committee, EDC 43

Chairman

DR K. N. MATHUR
National Physical Laboratory, New Delhi

Members

| | <i>Representing</i> |
|--|--|
| COL V. P. BAJAJ | Ministry of Defence (DGI) |
| SHRI S. N. ADHIKARI (<i>Alternate</i>) | Hindustan Machine Tools Ltd, Bangalore |
| SHRI R. S. BIR | Motor Industries Co Ltd, Bangalore |
| SHRI M. RANGASHAI (<i>Alternate</i>) | Jyoti Ltd, Baroda |
| SHRI H. BULGRIN | Poona Gauge and Tool Co, Poona |
| SHRI P. S. SANKARALINGAM (<i>Alternate</i>) | National Test House, Calcutta |
| SHRI S. CHAMARAJAN | Indian Engineering Association, Calcutta |
| SHRI A. D. GHATE | Jay Engineering Works Ltd, Calcutta |
| SHRI A. GHOSH | Engineering Association of India, Calcutta |
| SHRI S. P. GOYAL | Heavy Machine Building Plant, Heavy Engineering |
| SHRI I. B. GUHA | Corporation Ltd, Ranchi |
| SHRI B. N. GUPTA | Central Mechanical Engineering Research Institute |
| SHRI P. N. GUPTA | (CSIR), Durgapur |
| SHRI M. P. KUMARSWAMY | National Physical Laboratory (CSIR), New Delhi |
| SHRI R. V. RAMACHANDRAN (<i>Alternate</i>) | Central Scientific Instruments Organization |
| SHRI PREM PRAKASH | (CSIR), New Delhi |
| SHRI P. C. JAIN (<i>Alternate</i>) | Ministry of Railways |
| SHRI D. D. PURI | Indian Institute of Science, Bangalore |
| SHRI K. RAGHUNATHAN | Mahindra & Mahindra Ltd, Bombay |
| DR A. RAMACHANDRAN | Ex-Cell-O India Ltd, Bombay |
| SHRI R. KRISHNAN (<i>Alternate</i>) | The Accurate Engineering Co (P) Ltd, Poona |
| SHRI S. RAMCHANDRAN | The Praga Tools Ltd, Secunderabad |
| SHRI N. RAMAJAYAM | Indian Machine Tool Manufacturers' Association, |
| SHRI V. B. SALUNKE | Bombay |
| SHRI W. H. SIDDIQI | Director General, ISI (<i>Ex-officio Member</i>) |
| SHRI D. R. NARAYANA (<i>Alternate</i>) | |
| SHRI C. R. SONALKAR | |
| SHRI M. V. PATANKAR, Director (Mech Engg) | |

Secretary

SHRI S. CHANDRASEKHARAN
Deputy Director (Mech Engg), ISI

(*Continued on page 2*)

(*Continued from page 1*)

Gauges Subcommittee, EDC 43:3

Convener

SHRI PREM PRAKASH

Representing

National Physical Laboratory (CSIR), New Delhi

Members

SHRI MOHINDER NATH (*Alternate to*
Shri Prem Prakash)

SHRI H. BULGRIN

Motor Industries Co Ltd, Bangalore

SHRI P. S. SANKRALINGAM (*Alternate*)

Poona Gauge and Tool Co, Poona

SHRI A. D. GHATE

Indian Engineering Association, Calcutta

SHRI S. C. KHAN

Shri B. Sen (*Alternate*)

Engineering Association of India, Calcutta

SHRI K. KUMAR

Shri S. M. KALE (*Alternate*)

Hindustan Machine Tools Ltd, Bangalore

SHRI M. RANGASHAI

Shri S. KANNAN (*Alternate*)

The Praga Tools Ltd, Secunderabad

SHRI M. H. RAO

The Accurate Engineering Co (P) Ltd, Poona

SHRI V. B. SALUNKE

Central Mechanical Engineering Research Institute
(CSIR), Durgapur

DR M. M. SURI

Ministry of Defence (DGI)

COL S. C. TRIGUNAYAT

Indian Standard

SPECIFICATION FOR WELDED V-BLOCKS (DIAMETER RANGE 300 TO 2 000 mm)

0. F O R E W O R D

0.1 This Indian Standard was adopted by the Indian Standards Institution on 22 January 1968, after the draft finalized by the Engineering Metrology Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Larger V-blocks are widely used in workshops engaged in manufacturing heavy components, such as rollers for rolling mills, columns of hydraulic press, integral reduction gears, rotors, big bearings and cylinders of hydraulic press. V-blocks are widely used for marking centres accurately, checking roundness of cylindrical workpiece, and checking of concentricity, non-parallelism, etc, and also for holding the workpiece while machining.

0.3 Welded V-blocks are usually supplied in matched pairs, which consist of two V-blocks of the same accuracy. Such a pair of V-blocks is used together for marking, machining and inspection of bigger workpieces. Clamps are provided to bridge the vee to secure the workpieces.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies the sizes and other requirements of welded type V-blocks of large sizes used in the heavy engineering field.

*Rules for rounding off numerical values (revised).

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Matched Pairs — Two V-blocks of similar size and of the same accuracy.

2.2 Working Surfaces — Flanks of vees and bases of V-blocks.

2.3 Tolerance on Flatness — The permitted variation in the degree of flatness.

NOTE — A surface is said to be flat when all the elements that make up that surface are in exactly the same plane. The degree of flatness is the proportion to which the various elements that go to make up the surface, lie exactly in the same plane.

2.4 Tolerance on Parallelism — The maximum permissible distance separating two imaginary parallel planes within which the surface under consideration can just be enclosed. The two imaginary parallel planes are parallel to the datum surface of the part in question.

2.5 Tolerance on Squareness — The maximum permissible distance separating two imaginary parallel planes, within which the surface under consideration can just be enclosed. The two imaginary parallel planes are perpendicular to the datum surface of the part in question.

2.6 The Minimum and Maximum Size of Workpiece — The minimum and maximum diameters of cylindrical workpiece that can be accommodated on the V-block.

3. MATERIAL

3.1 V-blocks shall be of welded construction and made from suitable quality of weldable steels.

4. DIMENSIONS AND ACCURACIES

4.1 The general dimensions for V-blocks shall be as given in Table 1, read with Fig. 1 and 2.

4.2 Accuracies of V-Blocks

4.2.1 V-blocks shall comply with the tolerances for flatness of working surfaces, parallelism of vee to base and squareness of bisecting plane of vee faces with respect to the base, as specified in Table 2.

TABLE 1 DIMENSIONS FOR V-BLOCKS

(Clause 4.1, and Fig. 1 & 2)

(All dimensions in millimetres)

| SIZE | 700 | 1 000 | 1 400 | 2 000 | |
|---------------------------|--------------|-------|-------|-------|-------|
| ANGLE OF VEE | 90° | 90° | 110° | 110° | |
| SIZE OF WORKPIECE | <i>D</i> Max | 700 | 1 000 | 1 400 | 2 000 |
| | <i>D</i> Min | 300 | 600 | 900 | 1 300 |
| <i>a</i> Nom | 150 | 200 | 225 | 300 | |
| <i>b</i> Nom | 800 | 1 100 | 1 200 | 1 500 | |
| <i>b</i> ₁ Nom | 700 | 1 000 | 1 025 | 1 300 | |
| <i>b</i> ₂ Nom | 370 | 525 | — | — | |
| <i>c</i> Nom | 270 | 320 | 350 | 430 | |
| <i>d</i> Nom | M30 | M36 | — | — | |
| <i>d</i> ₂ Nom | 25 | 32 | — | — | |
| <i>e</i> Nom | 60 | 60 | 60 | 60 | |
| <i>f</i> Nom | 45 | 58 | 60 | 87 | |
| <i>g</i> Nom | 30 | 30 | 38 | 38 | |
| <i>h</i> Nom | 400 | 500 | 550 | 650 | |
| <i>h</i> ₁ Nom | 60 | 75 | — | — | |
| <i>j</i> Nom | 25 | 25 | 25 | 25 | |
| <i>k</i> Nom | 280 | 320 | 370 | 450 | |
| <i>m</i> Nom | 25 | 28 | 28 | 32 | |
| <i>n</i> Nom | 55 | 80 | — | — | |

4.2.2 For matched pairs too, the tolerances specified in Table 2 shall apply.

TABLE 2 ACCURACIES OF V-BLOCKS

(Clauses 4.2.1, 4.2.2 and 4.2.4)

Values in $\mu\text{m} = 0.001 \text{ mm}$

| SIZE OF V-BLOCK | PARALLELISM OF VEE TO BASE | SQUARENESS OF BISECTING PLANE OF VEE WITH BASE | MATCHING TOLERANCE |
|-----------------|----------------------------|--|--------------------|
| mm | | (Minutes of Arc) | |
| 700 | 38 | 10 | 18 |
| 1 000 | 45 | 10 | 20 |
| 1 400 | 50 | 10 | 22 |
| 2 000 | 60 | 10 | 25 |

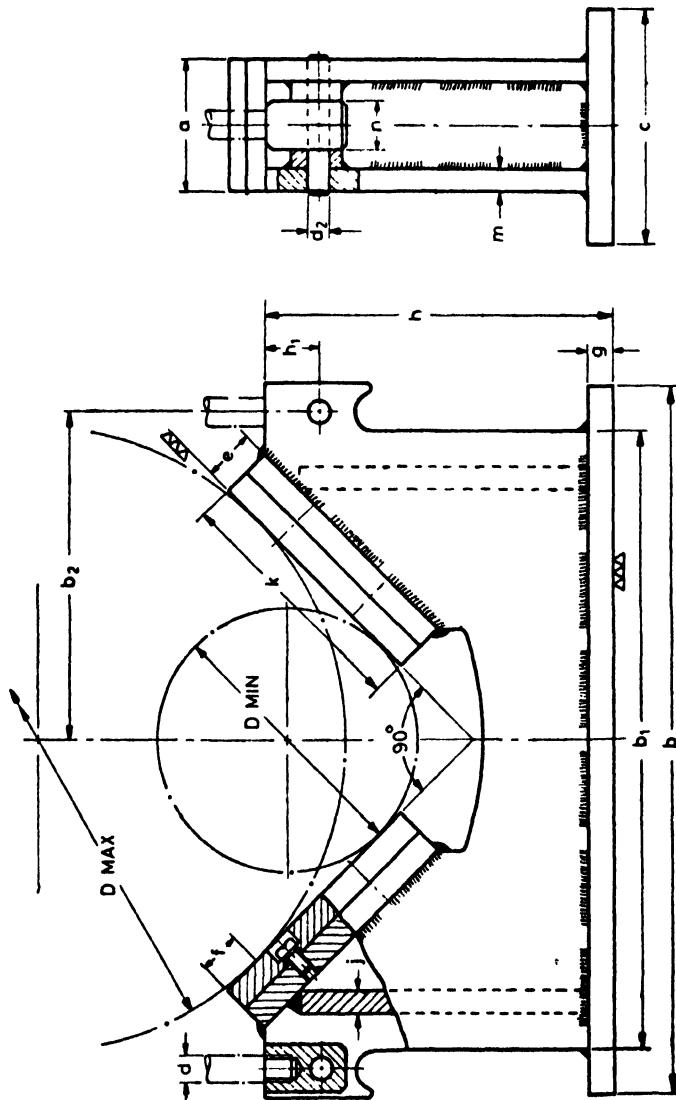


Fig. 1 DIMENSIONS FOR V.BLOCKS, SIZES 700 AND 1 000 mm

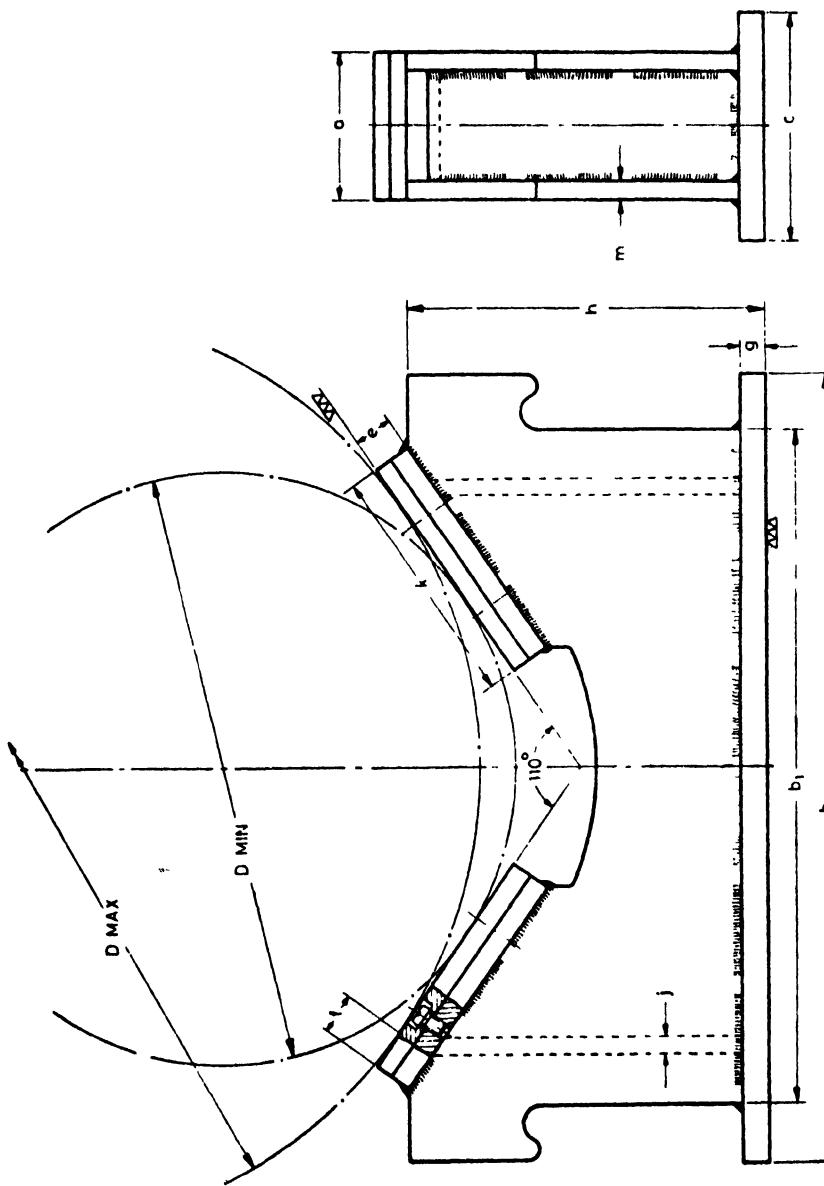


Fig. 2 DIMENSIONS FOR V-BLOCKS, SIZES 1400 AND 2000 mm

4.2.3 Any departure from flatness in the case of vee flanks shall be a convexity and not a concavity, and on base surface it shall be a concavity.

4.2.3.1 In a direction parallel to the axis of the vee, the departure from flatness shall be a concavity and not a convexity.

4.2.4 The included angle of the vee shall be 90° for sizes 700 and 1 000 mm, and 110° for sizes 1 400 and 2 000 mm, with a tolerance of ± 5 minutes, and shall be positional subject to the conditions laid down in Table 2 where applicable.

5. DESIGNATION

5.1 V-blocks shall be designated by the nominal size and the number of this standard.

Example :

A V-block of size 700 mm shall be designated as :

V-Block 700 IS : 4492

6. GENERAL REQUIREMENTS

6.1 The welded structure of V-block shall be suitably annealed before machining operations, to release it of the internal stresses developed due to welding*.

6.2 The flanks of vee shall be hardened to 54 to 58 HRC (see IS : 1586-1960†). They shall be rigidly secured, on the corresponding machined surfaces of the welded vee structure, with a suitable number of screws.

6.3 V-blocks of sizes 700 and 1 000 mm may be provided with clamping units, if required by the purchaser.

6.4 All sharp edges shall be removed. The V-blocks shall be free from non-metallic inclusions, porosity and other defects.

6.5 Bearing Area — V-blocks which are finished by hand scraping shall have a bearing area of not less than 20 percent. (A recommended method of determining this percentage is given in Appendix A.)

7. MARKING

7.1 The V-blocks shall have legibly marked upon it, its nominal size and the manufacturer's identification or trade-mark. Matched pairs shall be specifically marked for identification.

*See ISI Handbook of manual metal-arc welding for welders.

†Method for Rockwell hardness test (B and C scales) for steel.

7.1.1 The product may also be marked with Standard mark.

7.1.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

8. PAINTING AND GREASING

8.1 All non-machined surfaces shall be painted. In case of matched pair, both the blocks shall be painted with the same colour of paint.

8.2 All working surfaces shall be suitably protected against corrosion by the application of suitable corrosion preventive.

9. PACKING

9.1 During storage and transit, all finished surfaces shall be suitably packed and protected against climatic conditions by being covered with a suitable corrosion preventive preparation.

A P P E N D I X A

(Clause 6.5)

**DETERMINATION OF THE PROPORTION OF
BEARING AREA**

A-1. METHOD

A-1.1 A V-block master (see **A-2**), with its surface blued, is rubbed against the surfaces of the V-block to be tested. This will bring small bearing areas clearly into view. A small glass plate on which an area 40×40 mm has been ruled into 400 small squares 2×2 mm in size, is then placed upon the surface. Each small square is then observed in turn and a note made of the estimated fraction of its area (in tenths) which is occupied by a 'high spot' on the surface underneath.

A-1.2 The addition of all these fractions when divided by four, gives the percentage of the bearing area of the surface over the region tested. The test is to be repeated at other positions on the surface in order to obtain a fair average figure.

A-1.3 It may be mentioned that after testing a few surfaces by this method, the results obtained, coupled with the general appearance of the bearing areas, enable a fairly close estimate to be made of the proportion of bearing area of a surface merely from its general appearance.

A-2. PREPARATION OF THE V-BLOCK MASTER

A-2.1 The V-block master, which has been rough machined, is rubbed against the blue surfaces of the master angle plate and the master surface plate (*see* Fig. 3 A and 3 B). This brings out into view the small bearing areas which shall be scraped off (*see* Fig. 4). This procedure is repeated until the master is produced which has the requisite number of spots per unit area uniformly distributed throughout the working surfaces.



FIG. 3 A

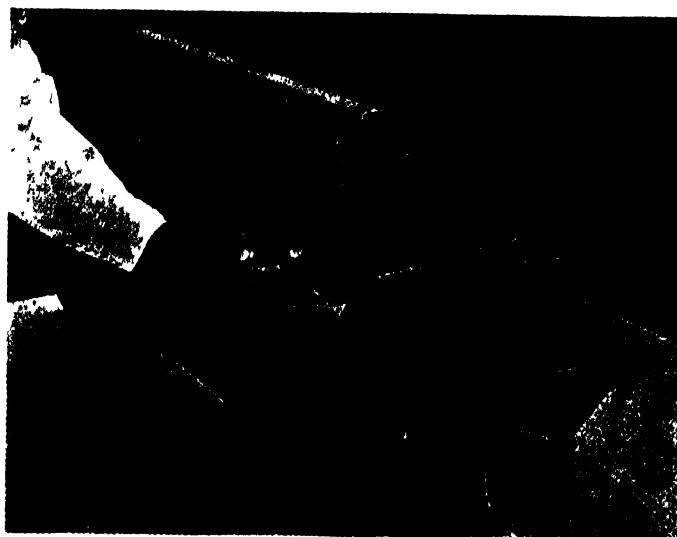


FIG. 3 B

IS : 4492 - 1966

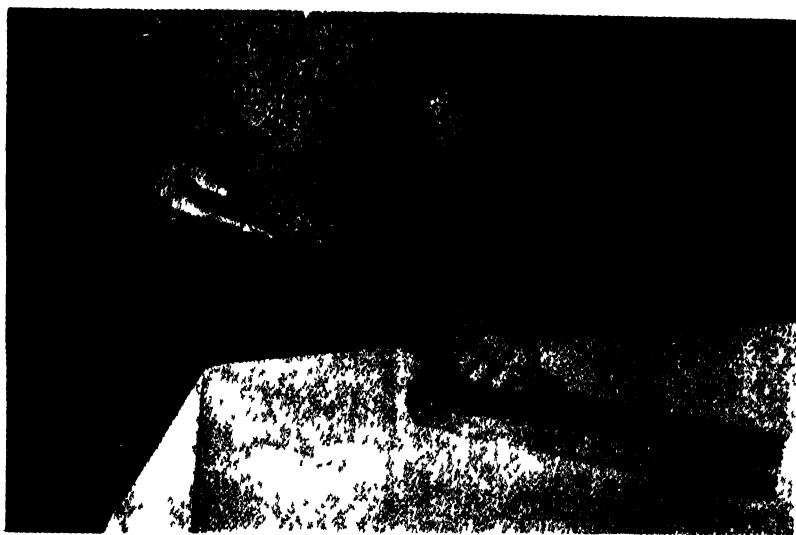


FIG 4

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones: 323 0131, 323 3375, 323 9402 **Fax:** +91 011 3234062, 3239399, 3239382

E-mail: bis@vsnl.com **website:** <http://www.bis.org.in>

Central Laboratory:

| | Telephone |
|---|------------------|
| Plot No. 20/9, Site IV, Sahibabad Industrial Area, SAHIBABAD 201010 | 477 00 32 |

Regional Offices:

| | |
|--|-----------|
| Central: Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002 | 323 76 17 |
|--|-----------|

| | |
|---|-----------|
| *Eastern: 1/14 CIT Scheme VII M, V.I.P. Road, Kankurgachi, KOLKATA 700054 | 337 86 62 |
|---|-----------|

| | |
|---|----------|
| Northern: SCO 335-336, Sector 34-A, CHANDIGARH 160022 | 60 38 43 |
|---|----------|

| | |
|--|-----------|
| Southern: C.I.T. Campus, IV Cross Road, CHENNAI 600113 | 254 19 84 |
|--|-----------|

| | |
|--|-----------|
| †Western: Manakalaya, E9, MIDC, Behind Marol Telephone Exchange, Andheri (East), MUMBAI 400093 | 832 92 95 |
|--|-----------|

Branch Offices:

| | |
|--|-----------|
| 'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001 | 550 13 48 |
|--|-----------|

| | |
|--|-----------|
| Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 560058 | 839 49 55 |
|--|-----------|

| | |
|--|----------|
| Commercial-cum-Office Complex, Opp. Dushera Maidan, E-5 Arera Colony, Bittan Market, BHOPAL 462016 | 72 34 52 |
|--|----------|

| | |
|---|----------|
| 62/63, Ganga Nagar, Unit VI, BHUBANESWAR 751001 | 40 36 27 |
|---|----------|

| | |
|---|----------|
| 5th Floor, Kovai Towers, 44 Bala Sundaram Road, COIMBATORE 641018 | 21 88 35 |
|---|----------|

| | |
|--|-----------|
| Plot No. 58, Neelam Bata Road, NIT, Faridabad 121001 | 542 82 61 |
|--|-----------|

| | |
|--|-----------|
| Savitri Complex, 116 G.T. Road, GHAZIABAD 201001 | 471 19 98 |
|--|-----------|

| | |
|--|----------|
| 53/5 Ward No. 29, R.G. Barua Road, 5th by-lane, Apurba Sinha Path, GUWAHATI 781003 | 54 11 37 |
|--|----------|

| | |
|---|-----------|
| 5-8-56C, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001 | 320 10 84 |
|---|-----------|

| | |
|--|----------|
| E-52, Chitrangan Marg, C-Scheme, JAIPUR 302001 | 37 38 79 |
|--|----------|

| | |
|--|----------|
| 117/418 B Sarvodaya Nagar, KANPUR 208005 | 21 68 76 |
|--|----------|

| | |
|---|----------|
| Seth Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road, LUCKNOW 226001 | 21 89 23 |
|---|----------|

| | |
|--|----------|
| NIT Building, Second Floor, Gokulpat Market, NAGPUR 440010 | 52 51 71 |
|--|----------|

| | |
|--|---------|
| Mahavir Bhavan, First Floor, Ropar Road, NALAGARH 174101 | 2 14 51 |
|--|---------|

| | |
|--|----------|
| Patliputra Industrial Estate, PATNA 800013 | 26 28 08 |
|--|----------|

| | |
|--|-----------|
| First Floor, Plot Nos. 657-660, Market Yard, Gultekdi, PUNE 411037 | 426 86 59 |
|--|-----------|

| | |
|---|----------|
| 'Sahajanand House' 3rd Floor, Bhaktinagar Circle, 80 Feet Road, RAJKOT 360002 | 37 82 51 |
|---|----------|

| | |
|--|----------|
| T.C. No. 14/1421, University P.O. Palayam, THIRUVANANTHAPURAM 695034 | 32 21 04 |
|--|----------|

| | |
|---|-----------|
| * Sales Office is at 5 Chowinghee Approach, P.O. Princep Street, KOLKATA 700072 | 237 10 85 |
|---|-----------|

| | |
|--|-----------|
| † Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007 | 309 65 28 |
|--|-----------|

AMENDMENT NO. 1 AUGUST 1978

TO

IS:4492-1968 SPECIFICATION FOR WELDED
V-BLOCKS (DIAMETER RANGE 300 TO 2 000 mm)

Alterations

(Page 8, clause 6.2, first sentence) -
Substitute the following for the existing
sentence:

'The flanks of vee shall be hardened to
54 to 58 HRC (see IS:1586-1968[†]).'

(Page 8, foot-note with '†' mark) -
Substitute the following for the existing
foot-note:

'[†]Method for rockwell hardness test (B and
C scales) for steel (first revision).'

(EDC 43)